

1 **Supplementary materials**

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3 Exogenous enzymes and probiotics alter digestion kinetics, volatile fatty acid content and microbial
4 interactions in the gut of Nile tilapia

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11 **Table S1.** The apparent digestibility coefficient (ADC, %) along the gastrointestinal tract of Nile
 12 tilapia.

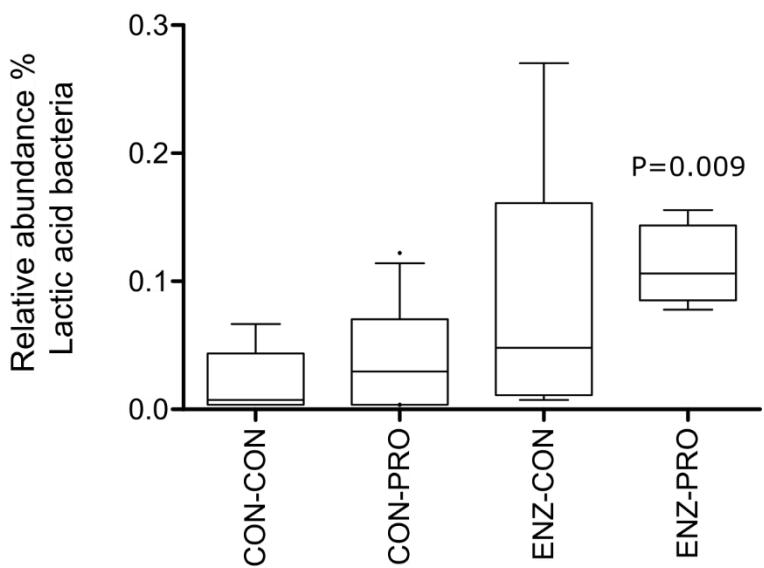
Enzymes Probiotics	CON		ENZ		SEM	P values			
	CON	PRO	CON	PRO		ENZ	PRO	ENZ*PRO	
<i>ADC (%)</i>									
Stomach									
Dry matter	-0.4	-0.5	2.9	0.2	0.9	ns	ns	ns	
Crude protein	0.1	6.9	4.0	7.8	1.8	ns	*	ns	
Ash	21.8	20.1	26.7	20.9	1.3	ns	ns	ns	
Phosphorous	13.0	16.9	17.8	13.9	0.9	ns	ns	#	
Calcium	18.2	19.8	20.5	13.4	1.1	ns	ns	*	
Copper	3.3	9.2	9.3	0.8	1.7	ns	ns	#	
Magnesium	20.3	11.2	25.3	18.7	3.7	ns	ns	ns	
Iron	-20.3	-31.8	-29.9	-26.0	0.9	ns	ns	ns	
Manganese	9.0	9.6	8.7	-3.4	4.8	ns	ns	ns	
Zinc	2.9	13.7	-1.4	-6.4	2.1	**	ns	*	
Proximal									
Dry matter	-53.0	-85.8	-37.7	-46.0	6.1	*	ns	ns	
Crude protein	-43.8	-68.3	-20.1	-22.2	2.3	*	ns	ns	
Ash	-95.7	-140.2	-74.5	-77.3	8.0	**	ns	ns	
Phosphorous	2.2	-4.1	23.7	22.5	3.0	**	ns	ns	
Calcium	-12.2	-18.9	-10.4	-15.8	1.7	ns	#	ns	
Copper	-137.9	-216.4	-160.2	-171.6	15.9	ns	ns	ns	
Magnesium	-65.2	-119.2	-77.0	-88.0	10.3	ns	ns	ns	
Iron	-84.1	-178.2	-98.0	-101.9	6.4	ns	ns	ns	
Manganese	-19.8	-36.6	-31.5	-44.7	17.4	*	**	ns	
Zinc	-48.1	-51.9	-59.1	-67.3	2.1	*	ns	ns	
Middle									
Dry matter	33.8	28.7	34.6	36.2	1.1	#	ns	ns	
Crude protein	57.0	55.6	59.3	62.3	0.9	*	ns	ns	
Ash	-20.0	-27.0	-14.8	-10.9	1.7	*	ns	ns	
Phosphorous	27.8	27.5	41.8	44.6	1.5	***	ns	ns	
Calcium	7.3	10.6	15.7	16.2	1.7	#	ns	ns	
Copper	2.2	2.9	-5.8	-1.4	2.5	ns	ns	ns	
Magnesium	12.5	9.4	13.7	17.0	1.5	ns	ns	ns	
Iron	-22.9	-41.0	-36.0	-56.9	1.0	ns	*	ns	
Manganese	-5.5	-23.2	-11.0	-22.6	4.3	ns	**	ns	
Zinc	-14.2	-14.5	-20.1	-22.5	1.8	**	ns	ns	
Distal									
Dry matter	45.7	47.0	46.5	49.2	1.6	ns	ns	ns	
Crude protein	69.7	70.4	69.7	72.7	1.5	ns	ns	ns	
Ash	-6.8	-6.4	3.6	6.5	2.1	*	ns	ns	
Phosphorous	29.2	28.9	42.0	46.8	1.2	***	ns	ns	
Calcium	7.1	9.3	16.8	20.4	1.6	**	ns	ns	
Copper	27.7	30.2	15.8	17.6	4.0	ns	ns	ns	
Magnesium	21.9	25.2	27.0	35.9	2.8	ns	ns	ns	
Iron	-34.1	-26.2	-36.8	-59.4	1.3	*	ns	#	
Manganese	-6.0	-22.1	-9.2	-24.8	4.0	ns	***	ns	

Zinc	-10.3	-7.0	-13.5	-19.2	1.6	*	ns	ns
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Note: CON, no supplementation; ENZ, enzyme (effect) supplementation; PRO, probiotic (effect) supplementation; ENZ*PRO, interaction effect ns, not significant, # $P < 0.1$, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

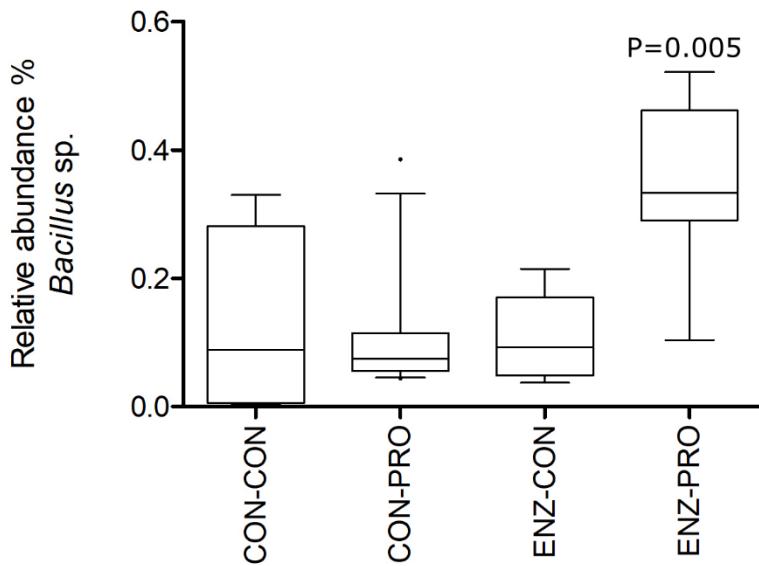
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17 **Supplementary Figure S1.** Relative abundance of lactic acid bacteria in the Nile tilapia distal gut.
18 Significance from CON-CON is indicated after Mann-Whitney test. CON-CON, no enzymes or
19 probiotics added; CON-PRO, probiotics added; ENZ-CON, enzymes added; ENZ-PRO, enzymes and
20 probiotics added.

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23 **Supplementary Figure S2.** Relative abundance of *Bacillus* species in the Nile tilapia distal gut.
24 Significance from CON-CON is indicated after Mann-Whitney test. CON-CON, no enzymes or
25 probiotics added; CON-PRO, probiotics added; ENZ-CON, enzymes added; ENZ-PRO, enzymes and
26 probiotics added.

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